Allen-Bradley

1756 ControlLogix Communication Modules Specifications

Standard ControlLogix Catalog Numbers 1756-EN2F, 1756-EN2T, 1756-EN2TR, 1756-EN3TR, 1756-EN2TSC, 1756-ENBT, 1756-EWEB, 1756-CN2, 1756-CN2R, 1756-CNB, 1756-CNBR, 1756-CN2RK, 1756-DNB, 1756-DHRIO, 1756-RIO, 1756-DH485, 1756-SYNCH

ControlLogix-XT Catalog Numbers 1756-EN2TXT, 1756-EN2TRXT, 1756-CN2RXT, 1756-DHRIOXT

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Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

Resource	Description
EtherNet/IP Modules Installation Instructions, publication ENET-IN002	Provides information on installing EtherNet/IP modules.
EtherNet/IP Secure Communication User Manual, publication ENET-UM003	Provides information on system architecture, configuring secure communication, and diagnostics.
ControlNet Modules Installation Instructions, publication CNET-IN005	Provides instructions for installing ControlNet modules.
ControlLogix System User Manual, publication 1756-UM001	Provides information on system architecture, configuring secure communication, and diagnostics.
DeviceNet Network Configuration User Manual, publication DNET-UM004	Provides information on system architecture, configuring communication, and diagnostics.
ControlLogix DH-485 Communication Module User Manual, publication 1756-UM532	Provides information on system architecture, configuring communication, and diagnostics.
ControlLogix Data Highway Plus-Remote I/O Communication Interface Module User Manual, publication 1756-UM514	Provides information about programming, messaging, applying, and connecting the module.
ControlLogix SynchLink Module User Manual, publication 1756-UM521	Provides information about topologies, configurations, planning, and installing a Synchlink module.
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation industrial system.
Product Certifications website, http://www.ab.com	Provides declarations of conformity, certificates, and other certification details.

You can view or download publications at http://www.rockwellautomation.com/literature/. To order paper copies of technical documentation, contact your local Allen-Bradley distributor or Rockwell Automation sales representative.

Summary of Changes

This manual contains new and updated information. Changes throughout this revision are marked by change bars, as shown to the right of this paragraph.

New and Updated Information

This table contains the changes made in this revision.

Topic	Page
Added ControlLogix EtherNet/IP Connections Specifications	5
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Removed the 1756-EN2F/B Model and Added 1756-EN2F/C module	6
Added ENET Module Diagrams	11
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Available Communication Modules

Network	Cat. No.	Description	Page
EtherNet/IP	1756-EN2F	EtherNet/IP bridge, fiber, 256 Logix connections	6
	1756-EN2T	EtherNet/IP bridge, copper, 256 Logix connections	6
	1756-EN2TSC	EtherNet/IP secure communication module	6
	1756-EN2TR	EtherNet/IP bridge, embedded switch, copper Supports as many as 8 axis of motion	6
	1756-EN3TR	EtherNet/IP bridge, embedded switch, copper Supports as many as 128 axis of motion	6
	1756-ENBT	EtherNet/IP bridge, copper, 128 Logix connections	6
	1756-EWEB	Ethernet web server, 128 Logix connections, Class 3 messaging only	6
	1756-EN2TXT	ControlLogix-XT™, EtherNet/IP bridge, copper, 256 Logix connections	6
	1756-EN2TRXT	ControlLogix-XT EtherNet/IP bridge module with embedded switch	6
ControlNet	1756-CN2/B, 1756-CN2/C 1756-CN2R/B, 1756-CN2R/C 1756-CN2RK	ControlNet bridge, 128 Logix connections(1)	13
	1756-CNB, 1756-CNBR	ControlNet bridge, 64 connections; recommend using only 40…48 Logix connections for I/O	13
	1756-CN2RXT	ControlLogix-XT, ControlNet bridge, 128 Logix connections(1)	17
DeviceNet	1756-DNB/E	DeviceNet bridge	21
Data Highway Plus™	1756-DHRIO	Data Highway Plus/Remote I/O module	25
	1756-DHRIOXT	ControlLogix-XT, Data Highway Plus/Remote I/O module	27
Remote I/O	1756-DHRIO	Data Highway Plus/Remote I/O module	25
	1756-RIO/B	Remote I/O module	25
	1756-DHRIOXT	ControlLogix-XT, Data Highway Plus/Remote I/O module	27
DH-485 module	1756-DH485	DH-485 module	30
SynchLink™	1756-SYNCH	SynchLink fiber-optic communication link	32

(1) 128 connections are available for standard use. An additional three connections are reserved for redundant control.

Communication Connections

A ControlLogix system uses connections to establish communication links between devices. The types of connections include the following:

- Controller-to-local I/O modules or local communication modules
- Controller-to-remote I/O or remote communication modules
- Controller-to-remote I/O (rack-optimized) modules
- Produced and consumed tags
- Messages
- Controller access with the Studio 5000 environment
- Controller access with RSLinx® software for HMI or other applications

You indirectly determine the number of connections the controller uses by configuring the controller to communicate with other devices in the system. The limit of connections may ultimately reside in the communication module you use for the connection. If a message path routes through a communication module, the connection related to the message also counts towards the connection limit of that communication module.

EtherNet/IP Network

The Ethernet Industrial (EtherNet/IP) network protocol is an open industrial-networking standard that supports both real-time I/O messaging and message exchange. The EtherNet/IP network uses off-the-shelf Ethernet communication chips and physical media.

If you need to	Select this interface
Control I/O modules and drives Act as an adapter for I/O on remote EtherNet/IP links Communicate with other EtherNet/IP devices (messages and HMI) Bridge EtherNet/IP links to route messages to devices on other networks	1756-EN2F bridge 1756-EN2T bridge 1756-ENBT bridge
Support device level ring (DLR) and linear topologies	1756-EN2TR redundant bridge 1756-EN3TR redundant bridge
Provide control in environments where temperatures range from -25…70 °C (-13…158 °F)	1756-EN2TXT bridge
Support device level ring (DLR) and linear topologies Provide control in environments where temperatures range from -25…70 °C (-13…158 °F)	1756-EN2TRXT redundant bridge
Secure access to a control system from within the plant network	1756-EN2TSC bridge
Use an Internet browser to remotely access tags in a ControlLogix controller Communicate with other EtherNet/IP or generic Ethernet devices (messaging only; no I/O control) Bridge EtherNet/IP links to route messages to devices on other networks	1756-EWEB web server

EtherNet/IP Network Specifications

Table 1 - ControlLogix EtherNet/IP Connections Specifications

Cat. No.	Connections		CIP Unconnected Messages (backplane + Ethernet)
	TCP	CIP[1]	
1756-ENBT	64	128	64 + 64
1756-EN2F	128	256	128 + 128
1756-EN2T	128	256	128 + 128
1756-EN2TXT	128	256	128 + 128
1756-EN2TR	128	256	128 + 128
1756-EN2TRXT	128	256	128 + 128
1756-EN2TSC	128	256	128 + 128
1756-EN3TR	128	256	128 + 128
1756-EWEB	64	128[1]	128 + 128

(1) CIP connections can be used for all explicit or all implicit applications. For example, a 1756-ENBT module has a total of 128 CIP connections that can be used for any combination of connections.

Table 2 - ControlLogix EtherNet/IP Data Specifications

Cat. No.	Produced/Consumed Tags		Socket Services	SNMP Support (password required)	Duplicate IP Detection (starting revision)
	Number of Multicast Tags, Max[1]	Unicast Available in RSLogix 5000 Software			
1756-ENBT	32	Version 16.03.00 or later	No	Yes	Revision 3.3
1756-EN2F	32	Version 16.03.00 or later	Yes	Yes	Revision 1.*x*
1756-EN2T	32	Version 16.03.00 or later	Yes	Yes	Revision 1.*x*
1756-EN2TXT	32	Version 16.03.00 or later	Yes	Yes	Revision 1.*x*
1756-EN2TR	32	Version 17.01.02 or later	Yes	Yes	Revision 1.*x*
1756-EN2TRXT	32	Version 20.01.00 or later	Yes	Yes	Revision 1.*x*
1756-EN2TSC	32	Version 20.01.00 or later	Yes	Yes	Revision 1.*x*
1756-EN3TR	32	Version 18.02.00 or later	No	Yes	Revision 3.*x*
1756-EWEB	N/A	N/A	Yes	Yes	Revision 2.2

(1) Each controller can send a maximum of 32 produced tags to one single consuming controller. If these same tags are sent to multiple consumers, the maximum number is 31.

Table 3 - ControlLogix EtherNet/IP Packet Rates Specifications

Cat. No.	Firmware Revision	RSLogix 5000 Software Version	RSLinx Software Version	Packet Rate Capacity (packets/second)[2]		Support for Extended Environment[3]	Integrated Motion on the EtherNet/IP Network Axes
				I/O	HMI/MSG		
1756-ENBT	Any	8.02.00 or later	2.30 or later	5000	900	No	N/A
1756-EN2F	2.*x*	15.02.00 or later	2.51 or later	10,000	2000	No	N/A
	3.6 or later	18.02.00 or later[1]		25,000			Up to 4 axes supported[4]
							Up to 8 axes supported[4]
1756-EN2T	2.*x* or earlier	15.02.00 or later	2.51 or later	10,000	2000	No	N/A
	3.6 or later	18.02.00 or later[1]		25,000[4]			Up to 8 axes supported[4]

Table 3 - ControlLogix EtherNet/IP Packet Rates Specifications

Cat. No.	Firmware Revision	RSLogix 5000 Software Version	RSLinx Software Version	Packet Rate Capacity (packets/second)(2)		Support for Extended Environment(3)	Integrated Motion on the EtherNet/IP Network Axes
				I/O	HMI/MSG		
1756-EN2TXT	2.*x*	15.02.00 or later	2.51 or later	10,000	2000	Yes	N/A
	3.6 or later	18.02.00 or later(1)		25,000(4)			Up to 8 axes supported(4)
1756-EN2TR	2.*x*	17.01.02 or later	2.55 or later	10,000	2000	No	N/A
	3.6 or later	18.02.00 or later(1)	2.56 or later	25,000(4)			Up to 8 axes supported(4)
1756-EN2TRXT	5.028 or later	20.01.00 or later	2.56 or later	25,000(4)	2000	Yes	N/A
1756-EN2TSC	5.028 or later	20.01.00 or later	2.56 or later	25,000(4)	930 with encryption 1800 without encryption	No	N/A
1756-EN3TR	3.6 or later	18.02.00 or later(1)	2.56 or later	25,000(4)	2000	No	Up to 255 axes supported(4)

(1) This version is required to use CIP Sync technology, Integrated Motion on the EtherNet/IP Network, or Exact Match keying.

(2) I/O numbers are maximums; they assume no HMI/MSG. HMI/MSG numbers are maximums, they assume no I/O. Packet rates vary depending on packet size. For more details, see Troubleshoot EtherNet/IP Application Technique, publication ENET-AT003, and the EDS file for a specific catalog number.

(3) Module operates in a broad temperature spectrum, -20…70 °C (-4…158 °F), and meets ANSI/ISA-S71.04-1985 Class G1, G2 and G3, as well as cULus, Class 1 Div 2, C-Tick, CE, ATEX Zone 2 and SIL 2 requirements for increased protection against salts, corrosives, moisture/condensation, humidity, and fungal growth.

(4) This value assumes the use of a 1756-L7*x* ControlLogix controller. For a 1756-L6*x* ControlLogix controller, see ControlLogix Controllers User Manual, publication 1756-UM001.

Table 4 - Technical Specifications - 1756 EtherNet/IP Modules

Attribute	1756-EN2F/C	1756-EN2T/D, 1756-EN2TSC/A	1756-EN2TR/C, 1756-EN3TR/B	1756-ENBT/A	1756-EWEB/B
EtherNet/IP communication rate	10/100 Mbps				
Current draw @ 5.1V DC	1.2 A	1A	1A	700 mA	700 mA
Current draw @ 24V DC	3 mA	—	—	3 mA	3 mA
Voltage and current ratings	5.1 V DC, 1.2A	—	—	—	—
Power dissipation	6.2 W	5.1 W	5.1 W	3.7 W	3.7 W
Thermal dissipation	21.28 BTU/hr	17.4 BTU/hr	17.4 BTU/hr	12.6 BTU/hr	12.6 BTU/hr
Isolation voltage	30V (continuous), Basic Insulation Type, USB to Backplane Type tested at980V AC for 60 s	30V (continuous), Basic Insulation Type, Ethernet to Backplane, USB to Backplane, and USB to Ethernet(3) Type tested at 980V AC for 60 s	30V (continuous), Basic Insulation Type, Ethernet to Backplane, USB to Backplane, and USB to Ethernet(3) Type tested at 980V AC for 60 s	30V (continuous), basic insulation type, Ethernet network to backplane Type tested @ 707V DC for 60 s	30V (continuous), basic insulation type, Ethernet network to backplane Type tested @ 707V DC for 60 s
Slot width	1				
Module location	Chassis-based, any slot				
Chassis	1756-A4, 1756-A7, 1756-A10, 1756-A13, 1756-A17				
Power supply, standard	1756-PA72, 1756-PA75, 1756-PB72, 1756-PB75, 1756-PC75, 1756-PH75				
Power supply, redundant	1756-PA75R, 1756-PB75R, 1756-PSCA2				
Ethernet port	1 Ethernet fiber	1 Ethernet RJ45 Category 5	2 Ethernet RJ45 Category 5	1 Ethernet RJ45 Category 5	
Ethernet cable	Multimode fiber, LC connector	802.3 compliant shielded or unshielded twisted pair	802.3 compliant shielded or unshielded twisted pair	802.3 compliant shielded or unshielded twisted pair	802.3 compliant shielded or unshielded twisted pair

Table 4 - Technical Specifications - 1756 EtherNet/IP Modules

Attribute	1756-EN2F/C	1756-EN2T/D, 1756-EN2TSC/A	1756-EN2TR/C, 1756-EN3TR/B	1756-ENBT/A	1756-EWEB/B
USB port(1)	USB 1.1, full speed (12 Mbps)	USB 1.1, full speed (12 Mbps	USB 1.1, full speed (12 Mbps	—	—
Wiring category(2)	3 - on USB ports	2 - on Ethernet ports 3 - on USB ports	2 - on Ethernet ports 3 - on USB ports	2 - on Ethernet ports	2 - on Ethernet ports
North American temperature code	T4A				
IEC temperature code	T4				
Enclosure type rating	None (open-style)				
Transmitter launch power at Beginning of Life (BOL), min Allow -1 dB at End of Life (EOL)	-19 dBm into 62.5/125 µm fiber, N/A = 0.275 -22.5 dBm into 50/125 µm fiber, N/A = 0.20	—	—	—	—

(1) The USB port is intended for temporary local programming purposes only and not intended for permanent connection. Do not use the USB port in hazardous locations.

(2) Use this conductor category information for planning conductor routing as described in the system level installation manual. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

(3) Applies only to these modules/series: 1756-EN2T/D,1756-EN2TSC/A, 1756-EN2TR/C,1756-EN3TR/B.

Table 5 - Environmental Specifications - 1756 EtherNet/IP Modules

Attribute	1756-EN2F/B	1756-EN2T/D, 1756-EN2TSC/A	1756-EN2TR/C, 1756-EN3TR/B	1756-ENBT/A, 1756-EWEB/B
Temperature, operating IEC 60068-2-1 (Test Ad, Operating Cold) IEC 60068-2-2 (Test Bd, Operating Dry Heat) IEC 60068-2-14 (Test Nb, Operating Thermal Shock)	0…60 °C (32…140 °F)			
Temperature, surrounding air, max	60 °C (140 °F)			
Temperature, storage IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold) IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat) IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40…85 °C (-40…185 °F)			
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged damp heat)	5…95% noncondensing			
Vibration IEC 60068-2-6 (Test Fc, Operating)	2 g @ 10…500 Hz			
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g			
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g	30 g(1)	30 g(1)	50 g
Emission CISPR 11 (IEC 61000-6-4)	Class A			
ESD immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges			

Table 5 - Environmental Specifications - 1756 EtherNet/IP Modules (Continued)

Attribute	1756-EN2F/B	1756-EN2T/D, 1756-EN2TSC/A	1756-EN2TR/C, 1756-EN3TR/B	1756-ENBT/A, 1756-EWEB/B
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine-wave 80% AM from 80…2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 1890 MHz 3V/m with 1 kHz sine-wave 80% AM from 2000…2700 MHz	10V/m with 1 kHz sine-wave 80% AM from 80…2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 1890 MHz 3V/m with 1 kHz sine-wave 80% AM from 2000…2700 MHz	10V/m with 1 kHz sine-wave 80% AM from 80…2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 1890 MHz 3V/m with 1 kHz sine-wave 80% AM from 2000…2700 MHz	10V/m with 1 kHz sine-wave 80% AM from 80…2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 1890 MHz 1V/m with 1 kHz sine-wave 80% AM from 2000…2700 MHz
EFT/B immunity IEC 61000-4-4	—	±3 kV at 5 kHz on Ethernet ports[1]	±3 kV at 5 kHz on Ethernet ports[1]	±2 kV at 5 kHz on Ethernet ports
Surge transient immunity IEC 61000-4-5	—	±2 kV line-earth (CM) on Ethernet ports	±2 kV line-earth (CM) on Ethernet ports	±2 kV line-earth (CM) on Ethernet ports
Conducted RF immunity IEC 61000-4-6	10V rms with 1 kHz sine-wave 80% AM from 150 kHz…80 MHz			

(1) Applies only to these modules/series: 1756-EN2T/D,1756-EN2TSC/A, 1756-EN2TR/C,1756-EN3TR/B.

Table 6 - Certifications - 1756 EtherNet/IP Modules

Certification[1]	1756-EN2T/D	1756-EN2F/C	1756-EN2TSC/B	1756-EN2TR/C, 1756-EN3TR/B	1756-ENBT/A	1756-EWEB/B
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810.					
CSA	CSA Certified Process Control Equipment. See CSA File LR54689C. CSA Certified Process Control Equipment for Class I, Division 2 Group A,B,C,D Hazardous Locations. See CSA File LR69960C.		—	—	CSA Certified Process Control Equipment. See CSA File LR54689C. CSA Certified Process Control Equipment for Class I, Division 2 Group A,B,C,D Hazardous Locations. See CSA File LR69960C.	CSA Certified Process Control Equipment. See CSA File LR54689C. CSA Certified Process Control Equipment for Class I, Division 2 Group A,B,C,D Hazardous Locations. See CSA File LR69960C.
CE	European Union 2004/108/IEC EMC Directive, compliant with: EN 61326-1; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity EN 61000-6-4; Industrial Emissions EN 61131-2; Programmable Controllers (Clause 8, Zone A & B)					
RCM	Australian Radiocommunications Act, compliant with EN 61000-6-4; Industrial Emissions					
Ex	European Union 94/9/EC ATEX Directive, compliant with the following: EN 60079-15; Potentially Explosive Atmospheres, Protection “n” EN 60079-0; General Requirements II 3 G Ex nA IIC T4 Gc X DEMKO13ATEX1325026X (1756-EN2T/C only)					
FM	**All modules except 1756-EN2TSC:** FM Approved Equipment for use in Class I Division 2 Group A,B,C,D Hazardous Locations					
IECEx	—	IECEx System, compliant with: IEC 60079-15; Potentially Explosive Atmospheres, Protection "n" IEC 60079-0; General Requirements II 3 G Ex nA IIC T4 Gc IECEx UL 14.0008X	—	—	—	—

Table 6 - Certifications - 1756 EtherNet/IP Modules

Certification(1)	1756-EN2T/D	1756-EN2F/C	1756-EN2TSC/B	1756-EN2TR/C, 1756-EN3TR/B	1756-ENBT/A	1756-EWEB/B
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3					
EAC	Russian Customs Union TR CU 020/2011 EMC Technical Regulation, compliant with: Russian Customs Union TR CU 004/2011 LV Technical Regulation, compliant with:					
EtherNet/IP	ODVA conformance tested to EtherNet/IP specifications					

(1) When product is marked. See the Product Certification link at http://www.ab.com for Declarations of Conformity, Certificates, and other certification details.

Table 7 - Technical Specifications - 1756 EtherNet/IP-XT Modules

Attribute	1756-EN2TXT/D, 1756-EN2TRXT/C
EtherNet/IP communication rate	10/100 Mbps
Logix communication connections	256
TCP/IP communication connections	128
Current draw @ 5.1V DC	1 A
Power dissipation	5.1 W 17.4BTU/Hr
Thermal dissipation	17.4 BTU/hr
Isolation voltage	30V (continuous), Basic Insulation Type, Ethernet to Backplane, USB to Backplane, and USB to Ethernet(1)
Slot width	1
Module location	Chassis-based, any slot
Chassis	1756-A4LXT, 1756-A5XT, 1756-A7XT, 1756-A7LXT
Power supply, standard	1756-PAXT, 1756-PBXT
Power supply, redundant	None
Ethernet port	2 Ethernet RJ45 Category 5
Ethernet cable	802.3 compliant shielded or unshielded twisted pair
USB port(2)	USB 1.1, full speed (12 Mbps)
Wiring category (3)	2 - on Ethernet ports 3 - on USB ports
North American temperature code	T4A
IEC temperature code	T4
Enclosure type rating	None (open-style)

(1) Applies only to these modules/series: 1756-EN2TXT/D, 1756-EN2TRXT/C.

(2) The USB port is intended for temporary local programming purposes only and not intended for permanent connection. Do not use the USB port in hazardous locations.

(3) Use this conductor category information for planning conductor routing as described in the system level installation manual. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

Table 8 - Environmental Specifications - 1756 EtherNet/IP-XT Module

Attribute	1756-EN2TXT/D, 1756-EN2TRXT/C
Temperature, operating IEC 60068-2-1 (Test Ad, Operating Cold) IEC 60068-2-2 (Test Bd, Operating Dry Heat) IEC 60068-2-14 (Test Nb, Operating Thermal Shock)	-25…70 °C (-13…158 °F)
Temperature, surrounding air, max	70 °C (158 °F)
Temperature, storage IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat) IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40…85 °C (-40…185 °F)
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged damp heat)	5…95% noncondensing
Vibration IEC 60068-2-6 (Test Fc, Operating)	2 g @ 10…500 Hz
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g
Emissions CISPR 11 (IEC 61000-6-4)	Class A
ESD immunity IEC 61000-4-2	6 kV contact discharges 8k V air discharges
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine-wave 80% AM from 80…2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 1890 MHz 3V/m with 1 kHz sine-wave 80% AM from 2000…2700 MHz
EFT/B immunity IEC 61000-4-4	±3 kV at 5 kHz on Ethernet ports(1)
Surge transient immunity IEC 61000-4-5	±2 kV line-earth (CM) on Ethernet ports
Conducted RF immunity IEC 61000-4-6	10V rms with 1 kHz sine-wave 80% AM from 150 kHz…80 MHz

(1) Applies only to these modules/series: 1756-EN2TXT/D, 1756-EN2TRXT/C.

Table 9 - Certifications - 1756 EtherNet/IP-XT Module

Certification(1)	1756-EN2TXT/D, 1756-EN2TRXT/C
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810.
CE	European Union 2004/108/IEC EMC Directive, compliant with the following: • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B)
RCM	Australian Radiocommunications Act, compliant with EN 61000-6-4; Industrial Emissions
Ex	European Union 94/9/EC ATEX Directive, compliant with the following: • EN 60079-15; Potentially Explosive Atmospheres, Protection “n” • EN 60079-0; General Requirements II 3 G Ex nA IIC T4 Gc X
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3
EtherNet/IP	ODVA conformance tested to EtherNet/IP specifications

(1) When product is marked. See the Product Certification link at http://www.ab.com for Declarations of Conformity, Certificates, and other certification details.

ENET Module Diagrams

Figure 1 - 1756-EN2T

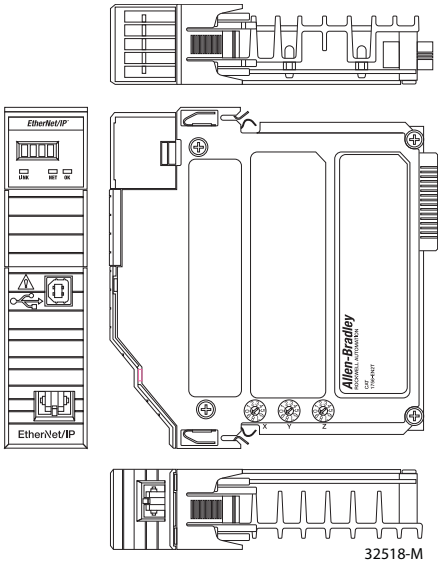


Figure 2 - 1756-EN2TR, 1756-EN3TR

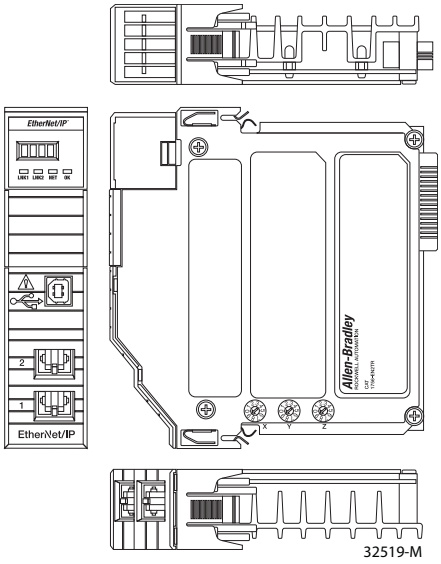
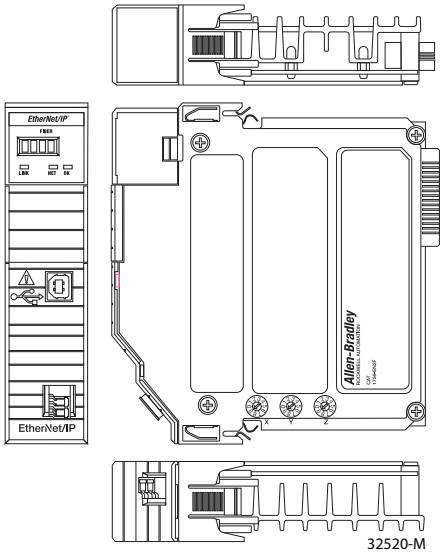


Figure 3 - 1756-EN2F



Accessories—Ethernet Network

Cat. No.	Description	Specifications
1585J-M8PBJM-*x*	Ethernet RJ45 patchcord *x* = 2 (2 m), 5 (5 m), or 10 (10 m)	8-conductor, teal riser PVC cable (flex-rated cable also available)
1585J-M8CC-H	RJ45 insulation displacement connector (IDC)	0.128…0.325 mm^2 (26…22 AWG), Cat. 6, IDC, no tool required
1585J-M8CC-C	RJ45 crimp connector with boot, qty = 50 pieces	0.128…0.205 mm^2 (26…24 AWG), Cat. 5e, requires crimp tool for assembly
1585A-JCRIMP	Crimp tool	—
9300-RADES	Remote access dial-in kit	56 Kbps modem connection to devices on an Ethernet network

Stratix Switches

To effectively manage real-time control and information flow throughout the manufacturing and IT enterprise, Rockwell Automation offers a full portfolio of industrial Ethernet switches and media, including a line of Stratix switches integrated with Cisco technology. The Stratix line of switches includes modular managed, fixed managed, and unmanaged switches.

For detailed specifications for Stratix switches, see Stratix Ethernet Switch Specifications Technical Data, publication 1783-TD001.

ControlNet Network

The ControlNet network is an open, control network for real-time, high-throughput applications. The ControlNet network uses the Common Industrial Protocol (CIP) to combine the functionality of an I/O network and a peer-to-peer network providing high-speed performance for both functions. The ControlNet network gives you deterministic, repeatable transfers of all mission-critical control data in addition to supporting transfers of non-time-critical data. I/O updates and controller-to-controller interlocking always take precedence over program uploads and downloads, and messaging.

If your application requires	Select one of these interfaces
128 ControlNet connections per communication module	1756-CN2/B 1756-CN2/C 1756-CN2R/B 1756-CN2R/C 1756-CN2RK/C 1756-CN2RXT/B 1756-CN2RXT/C
Control in environments where temperatures range from -25…70 °C (-13…158 °F)	1756-CN2RXT/C
40…48 ControlNet connections per communication module	1756-CNB 1756-CNBR

Connect to Other Devices via a ControlNet Network

The Studio 5000 environment supports a generic ControlNet module that allows connections to ControlNet nodes for which there is no specific support currently available in the programming software. A module configured as a generic ControlNet module communicates with the controller in the form of input, output, status, and configuration tags.

For example, use the generic module configuration to set up communication between a ControlLogix controller and a 1203-CN1 ControlNet communication module. Then use the CIP generic MSG instruction type to send and receive messages from the 1203-CN1 module.

Table 10 - Technical Specifications - 1756 ControlNet Modules

Attribute	1756-CN2/C	1756-CN2R/C, 1756-CN2RK/C	1756-CNB/E	1756-CNBR/E
Configuration	Standard	Redundant	Standard	Redundant
ControlNet communication rate	5 Mbps			
Logix communication connections	128		40…48	
Connections supported, max	131[3]		64	
Number of nodes, max	99			
Current draw @ 5.1V DC	1100 mA	1300 mA	970 mA	
Current draw @ 24V DC	3 mA		1.7 mA	
Power dissipation	5.6 W	6.7 W	5.1 W	
Thermal dissipation	19.1 BTU/Hr	22.9 BTU/hr	17.4 BTU/hr	

Table 10 - Technical Specifications - 1756 ControlNet Modules (Continued)

Attribute	1756-CN2/C	1756-CN2R/C, 1756-CN2RK/C	1756-CNB/E	1756-CNBR/E
Isolation voltage	Standard: 30V (continuous), basic insulation type, ControlNet network to backplane Redundant: 30V (continuous), basic insulation type, ControlNet A/B to backplane, and ControlNet A to ControlNet B USB to backplane and USB to ControlNet No isolation between NAP or USB and backplane Type tested at 500V AC for 60 s			
Weight, approx.	0.26 kg (0.57 lb)	0.293 kg (0.64 lb)	0.26 kg (0.57 lb)	0.293 kg (0.64 lb)
Slot width	1			
Module location	Chassis-based, any slot			
Chassis	1756-A4, 1756-A7, 1756-A10, 1756-A13, 1756-A17			
Power supply, standard	1756-PA72/C, 1756-PA75/B, 1756-PB72/C, 1756-PB75/B, 1756-PC75/B, 1756-PH75/B			
Power supply, redundant	1756-PA75R, 1756-PB75R, 1756-PSCA2			
ControlNet port	1 ControlNet BNC	2 ControlNet BNC	1 ControlNet BNC	2 ControlNet BNC
ControlNet cable	1786-RG6 quad shield RG6 coaxial cable			
USB port(1)	USB 1.1, full speed (12 Mbps)		—	—
NAP port	—	—	1 NAP RJ45	1 NAP RJ45
NAP cable	—	—	1786-CP	
Wiring category(2)	1 - on ControlNet ports 3 - on USB ports		1 - on ControlNet ports 3 - on NAP ports	
North American temperature code	T4A			
IEC temperature code	T4			
Enclosure type rating	None (open-style)			

(1) The USB port is intended for temporary local programming purposes only and not intended for permanent connection. Do not use the USB port in hazardous locations.

(2) Use this conductor category information for planning conductor routing as described in the system level installation manual. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

(3) 128 connections are available for standard use. An additional three connections are reserved for redundant control.

Table 11 - Environmental Specifications - 1756 ControlNet Modules

Attribute	1756-CN2/C, 1756-CN2R/C, 1756-CN2RK/C	1756-CNB/E, 1756-CNBR/E
Temperature, operating IEC 60068-2-1 (Test Ad, Operating Cold) IEC 60068-2-2 (Test Bd, Operating Dry Heat) IEC 60068-2-14 (Test Nb, Operating Thermal Shock)	0…60 °C (32…140 °F)	
Temperature, surrounding air, max	60 °C (140 °F)	
Temperature, storage IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold) IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat) IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40…85 °C (-40…185 °F)	
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5…95% noncondensing	
Vibration IEC 60068-2-6 (Test Fc, Operating)	2 g @ 10…500 Hz	
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g	
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g	50 g
Emissions CISPR 11 (IEC 61000-6-4)	Class A	
ESD immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges	
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine-wave 80% AM from 80…2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 1890 MHz 3V/m with 1 kHz sine-wave 80% AM from 2000…2700 MHz	
EFT/B immunity IEC 61000-4-4	±3 kV at 5 kHz on ControlNet ports	
Surge transient immunity IEC 61000-4-5	±2 kV line-earth (CM) on ControlNet ports	
Conducted RF immunity IEC 61000-4-6	10V rms with 1 kHz sine-wave 80% AM from 150 kHz…80 MHz	

Table 12 - Certifications - 1756 ControlNet Modules

Certification[1]	1756-CN2R/B, 1756-CNB/E, 1756-CNBR/E	1756-CN2/C, 1756-CN2R/C, 1756-CN2RK/C
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810.	
CSA	CSA Certified Process Control Equipment. See CSA File LR54689C. CSA Certified Process Control Equipment for Class I, Division 2 Group A,B,C,D Hazardous Locations. See CSA File LR69960C.	NA
CE	European Union 2004/108/IEC EMC Directive, compliant with the following: • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B)	
RCM	Australian Radiocommunications Act, compliant with: EN 61000-6-4; Industrial Emissions	
Ex	European Union 94/9/EC ATEX Directive, compliant with the following: • EN 60079-15; Potentially Explosive Atmospheres, Protection “n” • EN 60079-0; General Requirements • II 3 G Ex nA IIC T4 Gc X	
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3	
FM	FM Approved Equipment for use in Class I Division 2 Group A,B,C,D Hazardous Locations	
CI	ControlNet International conformance tested to ControlNet specifications	

(1) When product is marked. See the Product Certification link at http://www.ab.com for Declarations of Conformity, Certificates, and other certification details.

Table 13 - Technical Specifications - 1756 ControlNet-XT Module

Attribute	1756-CN2RXT/C
Configuration	Redundant
ControlNet communication rate	5 Mbps
Logix communication connections	128
Connections supported, max	131(3)
Number of nodes, max	99
Current draw @ 5.1V DC	1300 mA
Current draw @ 24V DC	3 mA
Voltage and current ratings	5.1V DC, 1.3A
Power dissipation	6.6W 22.5 BTU/Hr
Thermal dissipation	22.9 BTU/hr
Isolation voltage	30V (continuous), Basic Insulation Type, ControlNet A/B to Backplane, ControlNet A to ControlNet B, USB to ControlNet A/B, and USB to Backplane Type tested at 500V AC for 60 s
Weight, approx.	0.293 kg (0.64 lb)
Slot width	1
Module location	Chassis-based, any slot
Chassis	1756-A4LXT, 1756-A5XT, 1756-A7XT, 1756-A7LXT
Power supply, standard	1756-PAXT, 1756-PBXT
Power supply, redundant	None
ControlNet port	2 ControlNet BNC
ControlNet cable	1786-RG6 quad-shield RG6 coaxial cable
USB port(1)	USB 1.1, full speed (12 Mbps)
Wiring category(2)	1 - on ControlNet ports 3 - on USB port
North American temperature code	T4A
IEC temperature code	T4
Enclosure type rating	None (open-style)

(1) The USB port is intended for temporary local programming purposes only and not intended for permanent connection. Do not use the USB port in hazardous locations.

(2) Use this conductor category information for planning conductor routing as described in the system level installation manual. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

(3) There are 128 connections are available for standard use. An additional 3 connections are reserved for redundant control.

Table 14 - Environmental Specifications - 1756 ControlNet-XT Module

Attribute	1756-CN2RXT/C
Temperature, operating IEC 60068-2-1 (Test Ad, Operating Cold) IEC 60068-2-2 (Test Bd, Operating Dry Heat) IEC 60068-2-14 (Test Nb, Operating Thermal Shock)	-25…70 °C (-13…158 °F)
Temperature, surrounding air, max	70 °C (158 °F)
Temperature, storage IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold) IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat) IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40…85 °C (-40…185 °F)
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5…95% noncondensing
Vibration IEC 60068-2-6 (Test Fc, Operating)	2 g @ 10…500 Hz
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	1756-CN2RXT/C, 30 g 1756-CN2RXT/B, 50 g
Emissions CISPR 11 (IEC 61000-6-4)	Class A
ESD immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine-wave 80% AM from 80…2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 1890 MHz 3V/m with 1 kHz sine-wave 80% AM from 2000…2700 MHz
EFT/B immunity IEC 61000-4-4	±3 kV at 5 kHz on ControlNet ports
Surge transient immunity IEC 61000-4-5	±2 kV line-earth (CM) on ControlNet port
Conducted RF immunity IEC 61000-4-6	10V rms with 1 kHz sine-wave 80% AM from 150 kHz…80 MHz

Table 15 - Certifications - 1756 ControlNet-XT Module

Certification[1]	1756-CN2RXT/C
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810.
CE	European Union 2004/108/IEC EMC Directive, compliant with the following: • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B)
RCM	Australian Radiocommunications Act, compliant with EN 61000-6-4; Industrial Emissions
Ex	European Union 94/9/EC ATEX Directive, compliant with the following: • EN 60079-15; Potentially Explosive Atmospheres, Protection “n” • EN 60079-0; General Requirements II 3 G Ex nA IIC T4 Gc X
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3
CI	ControlNet International conformance tested to ControlNet specifications

(1) When product is marked. See the Product Certification link at http://www.ab.com for Declarations of Conformity, Certificates, and other certification details.

CNET Module Diagrams

Figure 4 - 1756-CN2

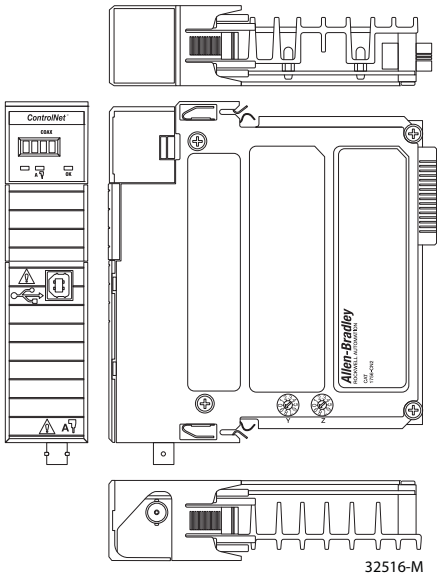
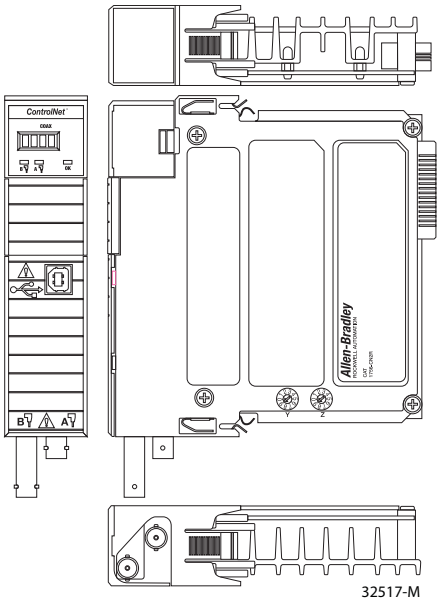


Figure 5 - 1756-CN2R



Accessories—ControlNet Network

Cat. No.	Description
Taps	
1786-TCT2BD1	T-tap straight IP67 rated
1786-TPR	T-tap right angle
1786-TPS	T-tap straight
1786-TPYR	Y-tap right angle
1786-TPYS	Y-tap straight
Cables	
1786-CP	Programming cable to ControlNet RJ45 port
1786-RG6	ControlNet network, shield high-flex cable
1756-RG6F	ControlNet network, quad-shield high-flex coax cable
Other	
1786-TNCLXT4	ControlNet IP67 termination resistor
1786-XT	ControlNet termination resistor
Repeaters	
1786-RPA	ControlNet modular repeater adapter
1786-RPCD	ControlNet coaxial hub repeater
1786-RPFRL	ControlNet fiber ring repeater, long distance
1786-RPFRXL	ControlNet fiber ring repeater, extra long distance
1786-RPFS	ControlNet fiber repeater, short distance
1786-RPFM	ControlNet fiber repeater, medium distance

For more information, see ControlNet Media System Components List, publication AG-PA002.

DeviceNet Network

The DeviceNet network is open, providing connections between simple industrial devices, such as sensors and actuators, and higher-level devices, such as controllers and computers. The DeviceNet network uses the Common Industrial Protocol (CIP) to control, configure, and collect data for industrial devices
.

Table 16 - Technical Specifications - 1756-DNB DeviceNet Module

Attribute	1756-DNB/E
DeviceNet communication rate	125 Kbps (500 m max) 250 Kbps (250 m max) 500 Kbps (100 m max)
Number of nodes, max	64
Current draw @ 5.1V DC	400 mA
Current draw @ 24V DC	0 mA
DeviceNet current draw @ 24V DC	60 mA
DeviceNet voltage range	11...25V DC CL 2/SELV
Power dissipation	3.5 W
Thermal dissipation	11.9 BTU/hr
Isolation voltage	50V (continuous), basic insulation type, DeviceNet network to backplane Type tested at 853V AC for 60 s No isolation between USB and backplane
Slot width	1
Module location	Chassis-based, any slot
Chassis	1756-A4, 1756-A7, 1756-A10, 1756-A13, 1756-A17
Power supply, standard	1756-PA72/C, 1756-PA75/B, 1756-PB72/C, 1756-PB75/B, 1756-PC75/B, 1756-PH75/B
Power supply, redundant	1756-PA75R, 1756-PB75R, 1756-PSCA2
DeviceNet power	To comply with the CE low voltage directive (LVD), the DeviceNet network must be powered from a source compliant with the safety extra low voltage (SELV) or protected extra low voltage (PELV). To comply with UL restrictions, the DeviceNet network must be powered from a source compliant with Class 2 or limited voltage/current.
DeviceNet port	1 DeviceNet open-style 5- or 10-pin linear plug
DeviceNet connector torque	0.56…0.79 N•m (5…7 lb•in)
USB port(1)	USB 2.0, full speed (12 Mbps)
Wiring category(2)	1 - On DeviceNet ports 3 - On USB ports
North American temperature code	T4A
IEC temperature code	T4
Enclosure type rating	None (open-style)

(1) The USB port is intended for temporary local programming purposes only and not intended for permanent connection. Do not use the USB port in hazardous locations.

(2) Use this conductor category information for planning conductor routing as described in the system level installation manual. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1. Refer to the DeviceNet Media Design and Planning Guide, publication DNET-UM072, for information specific to your DeviceNet network.

Table 17 - Environmental Specifications - 1756-DNB DeviceNet Module

Attribute	1756-DNB/E
Temperature, operating IEC 60068-2-1 (Test Ad, Operating Cold) IEC 60068-2-2 (Test Bd, Operating Dry Heat) IEC 60068-2-14 (Test Nb, Operating Thermal Shock)	0…60 °C (32…140 °F)
Temperature, surrounding air, max	60 °C (140 °F)
Temperature, storage IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold) IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat) IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40…85 °C (-40…185 °F)
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5…95% noncondensing
Vibration IEC 60068-2-6 (Test Fc, Operating)	2 g @ 10…500 Hz
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	50 g
Emissions CISPR 11 (IEC 61000-6-4):	Class A
ESD immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine-wave 80% AM from 80…2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 1890 MHz 3V/m with 1 kHz sine-wave 80% AM from 2000…2700 MHz
EFT/B immunity IEC 61000-4-4	±3 kV at 5 kHz on DeviceNet ports
Surge transient immunity IEC 61000-4-5	±2 kV line-earth (CM) on DeviceNet ports
Conducted RF immunity IEC 61000-4-6	10V rms with 1 kHz sine-wave 80% AM from 150 kHz…80 MHz

Table 18 - Certifications - 1756-DNB DeviceNet Module

Certification[1]	1756-DNB/E
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810.
CSA	CSA Certified Process Control Equipment. See CSA File LR54689C. CSA Certified Process Control Equipment for Class I, Division 2 Group A,B,C,D Hazardous Locations. See CSA File LR69960C.
CE	European Union 2004/108/IEC EMC Directive, compliant with the following: • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B)
RCM	Australian Radiocommunications Act, compliant with EN 61000-6-4; Industrial Emissions
Ex	European Union 94/9/EC ATEX Directive, compliant with the following: • EN 60079-15; Potentially Explosive Atmospheres, Protection “n” • EN 60079-0; General Requirements II 3 G Ex nA IIC T4 Gc X
FM	FM Approved Equipment for use in Class I Division 2 Group A,B,C,D Hazardous Locations
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3
DeviceNet	ODVA conformance tested to DeviceNet specifications

(1) When product is marked. See the Product Certification link at http://www.ab.com for Declarations of Conformity, Certificates, and other certification details.

Accessories—DeviceNet Network

Cat. No.	Description
KwikLink™ Lite flat media	KwikLink Lite flat media is a newer, ODVA-approved solution for wiring DeviceNet networks. Drop-lines for connecting nodes are added by using the KwikLink Lite two-piece connectors. This cable system supports the intermixing of DeviceNet cable types (thin-round with flat). All of the KwikLink Lite connectors provide insulation displacement technology with reduced assembly time.
KwikLink flat media	The KwikLink flat media system provides a modular cabling method with its flat four-wire cable and Insulation Displacement Connectors (IDCs). The KwikLink system allows nodes to be added to the network without severing the trunkline. Cutting or stripping of the trunkline is eliminated, as is the need for predetermined cable lengths.
Round media	Round trunk cable is available in bulk spools or as pre-molded cordsets or patchcords in varying lengths. A wide variety of rugged, durable DeviceNet components is available for use in round trunk systems. Stainless steel versions of round cable system components are also available: • Thick-trunk round media systems use thick cable for maximum DeviceNet trunk line length. • Round media thin-trunk systems use thin cable to reduce maximum trunk line distances with a more compact and cost-effective installation for some applications. Thin-cable outer jacket material is TPE for additional chemical resistance.

For more information on selecting DeviceNet media, see the NetLinx™ Selection Guide, publication NETS-SG001.

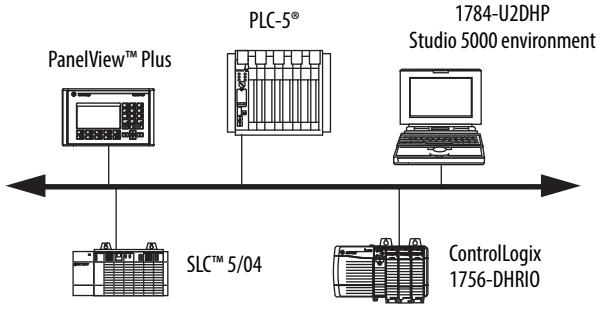
DH+ and Remote I/O Networks

The Data Highway Plus network supports messaging between devices. The remote I/O link connects to remote I/O chassis and other intelligent devices.

The 1756-DHRIO module supports messaging between devices on DH+™ networks. The remote I/O functionality enables the module to act as a scanner for transferring digital and block-transfer data to and from remote I/O devices.

The 1756-RIO module can act as a scanner or adapter on a remote I/O network. In addition to digital and block-transfer data, the 1756-RIO module transfers analog and specialty data without message instructions.

Example Configuration—DH+ Network



Example Configuration—Remote I/O Network

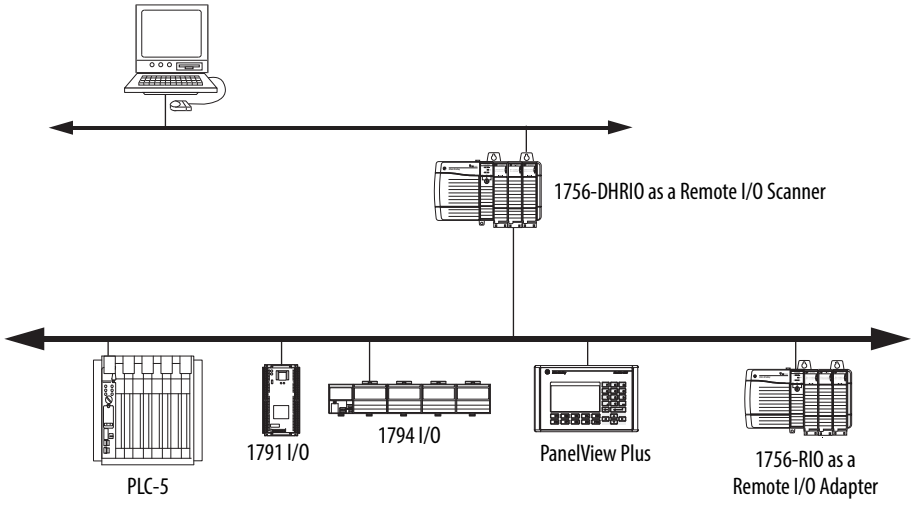


Table 19 - Technical Specifications - 1756 DH+ and Remote I/O Modules

Attribute	1756-DHRIO/E	1756-RIO/B
Communication rate	57.6 Kbps, 115.2 Kbps, 230.4 Kbps	
Remote I/O communication	Remote I/O scanner only 32 logical rack connections per remote I/O channel 16 block-transfer connections per remote I/O channel	Remote I/O scanner or adapter 32 physical racks (0…76), any combination of rack size and block transfers
Connections supported, max	32	10 scheduled I/O
Current draw @ 5.1V DC	850 mA	450 mA
Current draw @ 24V DC	1.7 mA	5 mA
Power dissipation	4.5 W	2.5 W
Thermal dissipation	15.4 BTU/hr	8.5 BTU/hr
Isolation voltage	30V (continuous), basic insulation type, DHRIO A/B to backplane, and DHRIO A/programming port to DHRIO B No isolation between DHRIO A and Programming port Type tested at 877V DC for 60 s	50V (continuous), basic insulation type, RIO communication lines to backplane Type tested at 500V AC for 60 s
Slot width	1	
Module location	Chassis-based, any slot	
Chassis	1756-A4, 1756-A7, 1756-A10, 1756-A13, 1756-A17	
Power supply, standard	1756-PA72/C, 1756-PA75/B, 1756-PB72/C, 1756-PB75/B, 1756-PC75/B, 1756-PH75/B	
Power supply, redundant	1756-PA75R, 1756-PB75R, 1756-PSCA2	
Ports	2, individually selectable for DH+ or remote I/O	1 for remote I/O
Screw terminal torque	—	0.5…0.6 N•m (5…7 lb•in)
Wire size	0.519 mm^2 (20 AWG) Belden 9463 copper twinaxial	
Wiring category(1)	2 - on DHRIO ports 3 - on local programming port	2 - on RIO ports
North American temperature code	T4A	
IEC temperature code	T4	—
Enclosure type rating	None (open-style)	

(1) Use this conductor category information for planning conductor routing as described in the system level installation manual. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

Table 20 - Environmental Specifications - 1756 DH+ and Remote I/O Modules

Attribute	1756-DHRIO/E	1756-RIO/B
Temperature, operating IEC 60068-2-1 (Test Ad, Operating Cold) IEC 60068-2-2 (Test Bd, Operating Dry Heat) IEC 60068-2-14 (Test Nb, Operating Thermal Shock)	0…60 °C (32…140 °F)	
Temperature, surrounding air, max	60 °C (140 °F)	
Temperature, storage IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold) IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat) IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40…85 °C (-40…185 °F)	
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5…95% noncondensing	

Table 20 - Environmental Specifications - 1756 DH+ and Remote I/O Modules (Continued)

Attribute	1756-DHRIO/E	1756-RIO/B
Vibration IEC 60068-2-6 (Test Fc, Operating)	2 g @ 10…500 Hz	
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g	
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	50 g	
Emissions CISPR 11 (IEC 61000-6-4)	Class A	
ESD immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges	
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine-wave 80% AM from 80…2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 1890 MHz 3V/m with 1 kHz sine-wave 80% AM from 2000…2700 MHz	
EFT/B immunity IEC 61000-4-4	± 2 kV at 5 kHz	±2 kV at 5 kHz
Surge transient immunity IEC 61000-4-5	± 2 kV line-earth (CM)	
Conducted RF immunity IEC 61000-4-6	10V rms with 1 kHz sine-wave 80% AM from 150 kHz…80 MHz	

Table 21 - Certifications - 1756 DH+ and Remote I/O Modules

Certification(1)	1756-DHRIO/E	1756-RIO/B
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810.	
CSA	CSA Certified Process Control Equipment. See CSA File LR54689C. CSA Certified Process Control Equipment for Class I, Division 2 Group A,B,C,D Hazardous Locations. See CSA File LR69960C.	—
CE	European Union 2004/108/IEC EMC Directive, compliant with the following: • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B)	
RCM	Australian Radiocommunications Act, compliant with EN 61000-6-4; Industrial Emissions	
Ex	European Union 94/9/EC ATEX Directive, compliant with the following: • EN 60079-15; Potentially Explosive Atmospheres, Protection “n” • EN 60079-0; General Requirements II 3 G Ex nA IIC T4 Gc X	—
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3	

(1) When product is marked. See the Product Certification link at http://www.ab.com for Declarations of Conformity, Certificates, and other certification details.

Table 22 - Technical Specifications - 1756 DH+ and Remote I/O XT Module

Attribute	1756-DHRIOXT/E
Communication rate	57.6 Kbps, 115.2 Kbps, 230.4 Kbps
DH+ communication connections	32 DH+ messages per DH+ module
Remote I/O communication connections	Remote I/O scanner only 32 logical rack connections per remote I/O channel 16 block-transfer connections per remote I/O channel
Connections supported, max	32
Current draw @ 5.1V DC	850 mA
Current draw @ 24V DC	1.7 mA
Power dissipation	4.5 W
Thermal dissipation	15.4 BTU/hr
Isolation voltage	30V (continuous), basic insulation type, DHRIO A/B to backplane, and DHRIO A/programming port to DHRIO B No Isolation between DHRIO A and Programming port Type tested at 853V AC for 60 s
Slot width	1
Module location	Chassis-based, any slot
Chassis	1756-A4LXT, 1756-A5XT, 1756-A7XT, 1756-A7LXT
Power supply, standard	1756-PBXT
Power supply, redundant	None
Ports	2, individually selectable for DH+ or remote I/O
Screw terminal torque	0.5…0.6 N•m (5…7 lb•in)
Wire size	0.519 mm^2 (20 AWG) Belden 9463 copper twinaxial
Wiring category(1)	2 - on DHRIO ports 3 - on local programming port
North American temperature code	T4A
IEC temperature code	T4
Enclosure type rating	None (open-style)

(1) Use this conductor category information for planning conductor routing as described in the system level installation manual. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

Table 23 - Environmental Specifications - 1756 DH+ and Remote I/O XT Module

Attribute	1756-DHRIOXT
Temperature, operating IEC 60068-2-1 (Test Ad, Operating Cold) IEC 60068-2-2 (Test Bd, Operating Dry Heat) IEC 60068-2-14 (Test Nb, Operating Thermal Shock)	-25…70 °C (-13…158 °F)
Temperature, surrounding air, max	70 °C (158 °F)
Temperature, storage IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold) IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat) IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40…85 °C (-40…185 °F)
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5…95% noncondensing
Vibration IEC 60068-2-6 (Test Fc, Operating)	2 g @ 10…500 Hz
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	50 g
Emissions CISPR 11 (IEC 61000-6-4)	Class A
ESD immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine-wave 80% AM from 80…2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 1890 MHz 3V/m with 1 kHz sine-wave 80% AM from 2000…2700 MHz
EFT/B immunity IEC 61000-4-4	±2 kV at 5 kHz on DHRIO ports
Surge transient immunity IEC 61000-4-5	±2 kV line-earth (CM) on DHRIO ports
Conducted RF immunity IEC 61000-4-6	10V rms with 1 kHz sine-wave 80% AM from 150 kHz…80 MHz

Table 24 - Certifications - 1756 DH+ and Remote I/O XT Module

Certification[1]	1756-DHRIOXT
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810.
CE	European Union 2004/108/IEC EMC Directive, compliant with the following: • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B)
RCM	Australian Radiocommunications Act, compliant with EN 61000-6-4; Industrial Emissions
Ex	European Union 94/9/EC ATEX Directive, compliant with the following: • EN 60079-15; Potentially Explosive Atmospheres, Protection “n” • EN 60079-0; General Requirements II 3 G Ex nA IIC T4 Gc X
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3

(1) When product is marked. See the Product Certification link at http://www.ab.com for Declarations of Conformity, Certificates, and other certification details.

Accessories—DH+ and Remote I/O Networks

Cat. No.	Description	Specifications
1770-CD	Cable to connect communication module to DH+ network	Belden 9463 twinaxial
9300-RADKIT	Remote access dial-in kit	56 Kbps modem connection to devices on a DH+ network, including the following: • Preconfigured modem • Communication module • DIN rail mounting hardware • Associated cables

DH-485 Network

On the DH-485 network, the controller can send and receive messages to and from other controllers on the network. The DH-485 connection does support remote programming and monitoring via the Studio 5000 environment. Excessive traffic over a DH-485 connection can adversely affect overall performance and can lead to timeouts and loss in the Studio 5000 environment configuration performance.

IMPORTANT Use Logix5000™ controllers on DH-485 networks only when you want to add controllers to an existing DH-485 network. For new applications with Logix5000 controllers, we recommend open architecture networks.

You need a 1761-NET-AIC converter for each controller on the DH-485 network. You can have two controllers per one 1761-NET-AIC converter, but you need a different cable for each controller. Connect one controller to port 1 (9-pin connector) and one controller to port 2 (mini-DIN connector).

To connect to this port	Use this cable
Port 1 DB-9 RS-232, DTE connection	1747-CP3, 1761-CBL-AC00
Port 2 mini-DIN 8 RS-232 connection	1761-CBL-AP00, 1761-CBL-PM02

Table 25 - Technical Specifications - 1756-DH485 Module

Attribute	1756-DH485
Communication rate	19.2 Kbps 9600 Kbps
Current draw @ 5.1V DC	850 mA
Current draw @ 24V DC	1.7 mA
Power dissipation	4.5 W
Thermal dissipation	15.4 BTU/hr
Isolation voltage	50V (continuous), basic insulation type, DH485 A/B to backplane, and DH485 A to DH485 B Type tested at 750V DC for 60 s
Slot width	1
Module location	Chassis
Power supply, standard	1756-PA72/C, 1756-PA75/B, 1756-PB72/C, 1756-PB75/B, 1756-PC75/B, 1756-PH75/B
Power supply, redundant	1756-PA75R, 1756-PB75R, 1756-PSCA2
Ports	2 DH-485 9-pin, D-shell
Wiring category(1)	2 - on DH485 ports
North American temperature code	T5
Enclosure type rating	None (open-style)

(1) Use this conductor category information for planning conductor routing as described in the system level installation manual. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

Table 26 - Environmental Specifications - 1756-DH485 Module

Attribute	1756-DH485
Temperature, operating IEC 60068-2-1 (Test Ad, Operating Cold) IEC 60068-2-2 (Test Bd, Operating Dry Heat) IEC 60068-2-14 (Test Nb, Operating Thermal Shock)	0…60 °C (32…140 °F)
Temperature, surrounding air, max.	60 °C (140 °F)
Temperature, storage IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold) IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat) IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40…85 °C (-40…185 °F)
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5…95% noncondensing
Vibration IEC 60068-2-6 (Test Fc, Operating)	2 g @ 10…500 Hz
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	50 g
Emissions CISPR 11 (IEC 61000-6-4)	Class A
ESD immunity IEC 61000-4-2	4 kV contact discharges 8 kV air discharges
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine-wave 80% AM from 80…2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 900 MHz 1V/m with 1 kHz sine-wave 80% AM from 2000…2700 MHz
EFT/B immunity IEC 61000-4-4	±2 kV at 5 kHz on communication ports
Surge transient immunity IEC 61000-4-5	±1 kV line-earth (CM) on communication ports
Conducted RF immunity IEC 61000-4-6	10V rms with 1 kHz sine-wave 80% AM from 150 kHz…80 MHz

Table 27 - Certifications - 1756-DH485 Module

Certification(1)	1756-DH485
c-UL-us	UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810.
CE	European Union 2004/108/IEC EMC Directive, compliant with the following: • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B)
RCM	Australian Radiocommunications Act, compliant with EN 61000-6-4; Industrial Emissions
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3

(1) When product is marked. See the Product Certification link at http://www.ab.com for Declarations of Conformity, Certificates, and other certification details.

Accessories—DH-485 Network

Cat. No.	Description	Specifications
1747-CP3	9-pin D-shell, straight; 9-pin D-shell, right angle	3 m (9.8 ft)
1761-CBL-AC00	9-pin D-shell, right angle; 9-pin D-shell, right angle	45 cm (17.7 in.)
1761-CBL-AP00	9-pin D-shell, right angle; 8-pin mini-DIN	45 cm (17.7 in.)
1761-CBL-PM02	9-pin D-shell, straight; 8-pin mini-DIN	2 m (6.5 ft)
1761-NET-AIC	Advanced Interface Converter (AIC+) connects each channel on the 1756-DH485 module to the DH-485 network	20.4. . .28.8V DC power source required Typical 120 mA 24V DC current draw
9300-RADKIT	Remote access dial-in kit	56 Kbps modem connection to devices on a DH+ network, including the following: • Preconfigured modem • Communication module • DIN rail mounting hardware • Associated cables

SynchLink Communication

The SynchLink module provides time synchronization and data broadcasting capabilities for distributed motion and coordinated drive control. The 1756-SYNCH SynchLink module connects a ControlLogix chassis to a SynchLink fiber-optic communication link. The module does the following:

- Coordinates Coordinated System Time across multiple ControlLogix chassis
- Moves a limited amount of data from one chassis to another at a high speed
- Lets one controller consume motion axes data from a controller in another chassis

Table 28 - Technical Specifications - 1756-SYNCH Module

Attribute	1756-SYNCH
SynchLink data rate	5 Mbps
Operating wavelength	650 nm (red)
Type of communication	Synchronous
Frame period	50 μs
Frame parameters	3 Flags - 3 bytes Control field - 1 byte Data field - 24 bytes CRC field - 2 bytes
Current draw @ 5.1V DC	1200 mA
Current draw @ 24V DC	3 mA
Power dissipation	6.2 W
Thermal dissipation	21.2 BTU/hr
Slot width	1
Module location	Chassis-based, any slot
Chassis	1756-A4, 1756-A7, 1756-A10, 1756-A13, 1756-A17
Power supply, standard	1756-PA72/C, 1756-PA75/B, 1756-PB72/C, 1756-PB75/B, 1756-PC75/B, 1756-PH75/B
Power supply, redundant	1756-PA1756-PA75R, 1756-PB75R, 1756-PSCA2

Table 28 - Technical Specifications - 1756-SYNCH Module (Continued)

Attribute	1756-SYNCH
Ports	2 fiber optic
Cable fiber type	200/230 micron HCS (Hard Clad Silica)
Cable fiber termination type	Versalink V-System
Cable length	1…300 m (3.28…984.2 ft)
North American Temp Code	T4A
Enclosure type rating	None (open-style)

Table 29 - Environmental Specifications - 1756-SYNCH Module

Attribute	1756-SYNCH
Temperature, operating IEC 60068-2-1 (Test Ad, Operating Cold) IEC 60068-2-2 (Test Bd, Operating Dry Heat) IEC 60068-2-14 (Test Nb, Operating Thermal Shock)	0…60 °C (32…140 °F)
Temperature, surrounding air, max.	60 °C (140 °F)
Temperature, storage IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold) IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat) IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40…85 °C (-40…185 °F)
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5…95% noncondensing
Vibration IEC 60068-2-6 (Test Fc, Operating)	2 g @ 10…500 Hz
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	50 g
Emissions CISPR 11 (IEC 61000-6-4)	Class A
ESD immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine-wave 80% AM from 80…2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM at 900 MHz 1V/m with 1 kHz sine-wave 80% AM from 2000…2700 MHz

Table 30 - Certifications - 1756-SYNCH Module

Certification(1)	1756-SYNCH
UL	UL Listed Industrial Control Equipment. See UL file E65584
CSA	CSA Certified Process Control Equipment. See CSA File LR54689C CSA Certified Process Control Equipment for Class I, Division 2 Group A,B,C,D Hazardous Locations. See CSA file LR69960C
CE	European Union 2004/108/EC EMC Directive, compliant with the following: • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B) • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61000-6-4; Industrial Emissions
RCM	Australian Radiocommunications Act, compliant with EN 61000-6-4; Industrial Emissions
FM	FM Approved Equipment for use in Class I Division 2 Group A,B,C,D Hazardous Locations
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3

(1) When product is marked. See the Product Certification link at http://www.ab.com for Declarations of Conformity, Certificates, and other certification details.

Accessories—SynchLink Network

Cat. No.	Description
1403-CF*xxx*	Rockwell Automation fiber-optic cable assembly
HCP-M0200T V01RK	Lucent Technologies 200 µm simplex cable

Notes:

Important User Information

Read this document and the documents listed in the additional resources section about installation, configuration, and operation of this equipment before you install, configure, operate, or maintain this product. Users are required to familiarize themselves with installation and wiring instructions in addition to requirements of all applicable codes, laws, and standards.

Activities including installation, adjustments, putting into service, use, assembly, disassembly, and maintenance are required to be carried out by suitably trained personnel in accordance with applicable code of practice.

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

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